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SUPPORT FRAME BARBECUE GRILL ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS:

Not Applicable.

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT:

Not Applicable.

TECHNICAL FIELD:

The present invention relates to a support frame barbecue grill. More specifically, the present invention relates to a barbecue grill support frame assembly having distinct sub-assemblies.

BACKGROUND OF THE INVENTION:

Over the past two decades, gas barbecue grills have become increasingly popular as outdoor cooking devices. Gas barbecue grills generally consist of a support structure connected to a cooking chamber. The structure can be configured to provide support for other elements, including a fuel tank and auxiliary cooking surfaces. The support structure is usually formed from a substantial number of frame members connected together with fasteners such as nuts and bolts. Gas barbecue grills are typically packaged with the support structure, the cooking chamber, and any related accessories disassembled to reduce the packaging size.

A concern with gas barbecue grills of this type is the difficulty in assembling the grill. Due to the large number of packaged components, including the frame members, the fasteners, and other related hardware, the purchaser is required to perform a myriad number of steps to connect the frame members and assemble the support structure. The purchaser faces more time-consuming steps when connecting the cooking chamber to the support structure. The assembly becomes even more daunting when the barbecue grill includes auxiliary cooking surfaces, auxiliary cooking burners, and other accessories such as temperature gages and cooking controls. As a general rule, the assembly process becomes more difficult as the complexity of the grill design increases. From a marketing standpoint, a grill design that involves a complex assembly process is unappealing to potential purchasers and as a result, should be avoided.

A second concern with this type of gas barbecue grills is that the support structure is susceptible to a loss of structural integrity due to the multiplicity of fasteners used to hold

the frame members together. Also, the fasteners may wear and loosen over time. The reduction in structural integrity can also affect side support structures connected to the support structure and cause a reduction in the load-bearing capacity of the side support structures. As a result, additional and more complex structure may be required.

An example of existing gas barbecue grill designs suffering from the problems identified above is U.S. Patent No. 5,140,973 to Home. Referring to FIGS. 1 and 4 therein, the grill 1 has a considerable number of individual components that are secured with threaded fasteners that are susceptible to loosen over time. Consequently, the grill assembly experiences a reduction in structural integrity. Also, as shown in FIG. 3, the upper post 31 and lower post 32 are connected with a spring 4 that results in a non-linear, disjointed appearance at the junction of the posts 31, 32.

Another example of existing gas grill design with a complex assembly that is susceptible to a reduction in structural integrity over time is U.S. Patent No. 4,984,515 to Pivonka. Referring to FIGS. 1 and 3 therein, cart assembly 10 is formed from numerous frame members 16, 76, 78 inserted through sleeves 36, 38, 40, 42, which are attached to end frame members 12, 14. The frame members 16, 76, 78 are secured in place by the interaction of a threaded fastener 52, 54, 56, 58 and nut 44, 46, 48, 50 with the sleeves 36, 38, 40, 42.

Yet another example of a gas grill design suffering from the above-identified problems is U.S. Patent No. 5,623,866 to Home. Referring to FIGS. 1-3 and 5, the cart assembly 10 comprises a plurality of frame members 3 and two support brackets 1. The frame members 3 are secured to the brackets 1 by spring-loaded ball 112 embedded in a rigid wall fo the bracket 1 and that engages hole 31 in the member 3. Side tables 4 are secured to

the brackets 1 by threaded fasteners inserted through apertures located in an upper portion of each bracket 1. Similarly, the cooking chamber 2 is secured to the brackets 1 by threaded fasteners inserted through apertures located in a top portion of each bracket 1.

Therefore, there is a definite need for a barbecue grill assembly having a durable support frame that can be simply and reliably assembled. In addition, there is a need for a barbecue grill assembly that can be compactly packaged in a state that facilitates easy assembly.

SUMMARY OF THE INVENTION:

It is an object of the invention to provide a barbecue grill assembly comprising an upper assembly and a lower assembly, the upper assembly adapted to receive a cooking chamber. The grill assembly further comprises at least one projection on one of either the lower assembly or the upper assembly, and at least one receiver on the other assembly.

In accord with the invention, the projection and the receiver are cooperatively dimensioned such that the projection is received by the receiver. The projection having a first portion and a second portion wherein the first portion is adapted to be biased into contact with an inner surface of the receiver.

In additional accord with the invention, the barbecue grill assembly includes a lateral assembly, positioned proximate the upper assembly. The lateral assembly is adapted to receive an auxiliary work surface or a cooking burner.

In further accord with the invention, the upper, lower, and lateral assemblies are each formed from a plurality of tubular frame members. The upper, lower, and lateral assemblies

each can be pre-assembled by welding the frame members. These assemblies can include receivers and insertable projections for assembly by the user.

In still further accord with the invention, the barbecue grill assembly includes means for biasing the first portion of the projection into engagement with the inner surface of the receiver to generally secure the upper and lower assemblies.

Other features and advantages of the invention will be apparent from the following specification taken in conjunction with the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS:

FIG. 1 is a front elevation view of a barbecue grill assembly of the invention;

FIG. 2 is a perspective view of the barbecue grill assembly of FIG.1, showing an upper assembly, a lower assembly, and a lateral assembly ;

FIG. 3 is an exploded perspective view of the barbecue grill assembly of FIG.1;

FIG. 4 is a perspective view of a projection of the barbecue grill assembly of FIG.1;

FIG. 5 is a side view of the projection of FIG.4;

FIG. 6 is a partial cross-section of the projection of the barbecue grill assembly of FIG.1, showing the projection inserted in a receiver in a unbiased position;

FIG. 7 is a partial cross-section of the projection of FIG. 6, showing the projection inserted in the receiver in a biased position;

FIG. 8 is a cross-section of the projection and the receiver taken along line 8-8 of FIG. 6, showing the projection and the receiver in the unbiased position;

FIG. 9 is a cross-section of the projection and the receiver taken along line 9-9 of

FIG. 7, showing the projection and the receiver in the biased position;

FIG. 10 is a perspective view of a second projection embodiment of the barbecue grill assembly of FIG.1;

FIG. 11 is a partial cross-section of the projection of FIG. 10, showing the projection inserted in the receiver in the unbiased position;

FIG. 12 is a partial cross-section of the projection of FIG. 10, showing the projection inserted in the receiver in the biased position;

FIG. 13 is a cross-section of the projection and the receiver taken along line 13-13 of FIG. 11, showing the projection and the receiver in the unbiased position;

FIG. 14 is a cross-section of the projection and the receiver taken along line 14-14 of FIG. 12, showing the projection and the receiver in the biased position;

FIG. 15 is a perspective view of a third projection embodiment of the barbecue grill assembly of FIG.1;

FIG. 16 is a perspective view of a second embodiment of a barbecue grill assembly of the invention;

FIG. 17 is an exploded perspective view of the barbecue grill assembly of FIG. 18;

FIG. 18 is an exploded elevation view of the barbecue grill assembly of FIG. 1; and,

FIG. 19 is an elevation view of the barbecue grill assembly of FIG. 1, showing the grill assembly in a stacked position.

DETAILED DESCRIPTION OF THE INVENTION:

While this invention is susceptible of embodiment in many different forms, there is

shown in the drawings and will herein be described in detail preferred embodiments of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the broad aspect of the invention to the embodiments illustrated.

A barbecue grill assembly **10** is shown in FIG. 1. The barbecue grill assembly **10** comprises an upper frame assembly **12**, a lower assembly **14**, and a lateral assembly **40.** The upper frame assembly **12** has a configuration sufficient to receive and/or support a cooking chamber or firebox **16.** In addition, the barbecue grill assembly **10** can include a controls **18**, control panel **20**, temperature gauge **21**, wheels **22**, and casters **24.** The grill assembly **10** includes at least one junction **11**. In general terms, the junction **11** is a cooperative structure resulting from joined structures of the grill assembly **10**.

Referring to FIGS. 2 and 3, in a preferred embodiment, the upper frame assembly **12** is formed from at least one frame member, including upper vertical members **26**, upper horizontal members **28**, and upper cross members **30.** The number and size of members **26**, **28**, **30** comprising the upper assembly **12** can vary according to design parameters, including the size and shape of the cooking chamber **16.** The upper frame assembly **12** has an upper interior space **27** defined by the members **26**, **28**, **30**, which is adapted to receive the cooking chamber **16.** The upper assembly **12** can include a cross-member (not shown) connecting one side of the vertical members **26.** The cross-member is adapted to provide additional support to the side that it is connecting. The cross-member can be configured as a panel or elongated structure to engage and/or support a fuel tank (not shown). In addition, a tank scale (not shown) can be attached to the cross-member wherein the fuel tank is connected to

the tank scale and the cross-member.

Alternatively, to reduce the number of components in the upper assembly **12**, the horizontal members **28** or the cross members **30** can be omitted from the assembly **12.** Accordingly the remaining members would define the interior space **27** adapted to receive the cooking chamber **16.** In this configuration, at least one vertical member **26** extends from a portion or a surface of the cooking chamber **16.**

To further reduce the number of components in the upper assembly **12**, the horizontal members **28** and the cross members **30** are omitted from the assembly **12.** Accordingly, the cooking chamber **16** and at least one vertical member **26** defines the upper assembly **12.** In this configuration, the vertical member **26** extends from a portion or a surface of the cooking chamber **16.**

In a further attempt to reduce the number of components in the upper assembly **12**, the cooking chamber **16** is formed or cast with at least one socket or stem. Preferably, the socket depends from a portion or a surface of the cooking chamber **16.** The socket can have a wide range of dimensions and configurations. An open end of the socket has an inner dimension and as a result, the socket is adapted to receive a portion of a structural element of the lower assembly **14.** In this configuration, the separate vertical member **26** of the upper assembly **12** can be omitted.

Alternatively, the socket is adapted to receive a portion of a union member to secure the upper and lower assemblies **12, 14**. As described in detail below, the union member is an elongated structure adapted to be inserted into a portion of the socket and a portion of the lower assembly to join and secure the upper and lower assemblies **12, 14**.

In a preferred embodiment, the lower frame assembly **14** is formed from at least one frame member, including lower vertical members **32**, a rack, panel, or tray **34**, and lower cross members **36.** Preferably, the members **32**, **36** form two H-shaped sub-assemblies. Each of the sub-assemblies can be pre-assembled by a number of methods, including welding the members **32**, **36**, or by use of fasteners. The tray **34** is a generally rigid structure that joins the members **32**, **36** to form the lower assembly **14.** In addition to providing structural support to the lower assembly **14**, the tray **34** can provide storage for the accessories used in connection with the grill assembly **10.**

Alternatively, the tray **34** can be replaced by at least one horizontal member (not shown) similar to members **32**, **28** to provide horizontal support to the lower assembly **14.** The horizontal member thereby joins the H-shaped sub-assemblies. Alternatively, the horizontal member and the members **32**, **38** are pre-assembled by a number of methods, including welding, or fasteners, to form the lower assembly **14.** A wheel lug **38** extends from a lower portion of the lower vertical member **32**, and is adapted to receive a wheel **22.**

In a preferred embodiment, the grill assembly **10** includes a lateral frame assembly **40**, which is positioned generally lateral to the upper frame assembly **12.** The lateral frame assembly **40** is formed from at least one frame member, including lateral frame members **42** and a trim piece or an end cap **44.** Although the lateral assembly **40** is shown on the one side of the upper assembly **12**, the assembly **12** can be positioned on either side of the upper assembly **12.** In addition, lateral assemblies **12** could be positioned on both sides of the upper assembly **12.** The lateral assembly **40** is adapted to provide extended support for an auxiliary cooking burner, a work surface, or control elements. This means that the lateral

assembly **40** supports the cooking burner, the work surface, or the control elements in an extended and a cantilevered position. The dimensions and configuration of the lateral assembly **40** vary with the design parameters of the grill assembly **10**.

Although shown positioned only lateral to the upper assembly **12**, the lateral assembly **40** can be positioned lateral to the lower assembly **14.** In this configuration, the lateral assembly **40** supports a fuel tank or other accessories for use in connection with the grill assembly **10.** The number of lateral assemblies **40** employed in the grill assembly **10** varies with the design parameters of the grill assembly **10.**

The junction **11** is a cooperative structure between the lower frame member **32** and the upper frame member **26.** Described in a different manner, the junction **11** is a position of securement between the upper and lower frame members **26, 32.** In addition, the junction **11** is a cooperative structure between the lateral member **42** and the horizontal member **28.** Although the junction **11** is shown at a general mid-point between the upper and lower assemblies **12, 14,** junction **11** can be located at various points in the grill assembly **10.** Consequently, the length of the members in the upper and lower assemblies **12, 14** can vary. Although a total of six separate junctions **11** are shown in FIGS. 2 and 3, a greater or lesser quantity of junctions **11** can be employed to join the upper and lower assemblies **12, 14** and the upper and lateral assemblies **12, 40** depending upon the design parameters, including the configuration of each assembly **12, 14, 40.**

An alternate embodiment comprises a frame for an outdoor cooking device (not shown) generally comprising an upper assembly and a lower assembly. Instead of receiving a cooking chamber, the frame is adapted to receive a cooking device, for example an outdoor

stove-top burner, or a deep fryer. The cooking device and the frame are adapted such that the device is generally surface- mounted within the frame. This means that an upper surface of the cooking device and an upper surface of the frame are generally in planar alignment. The auxiliary burner is surface-mounted within the frame. The frame is adapted to be mobile such that the frame and the cooking device can be moved between various locations, thereby increasing the versatility of the frame.

Alternatively, the frame for an outdoor cooking device comprises a first assembly positioned proximate a second assembly. In this manner, the second assembly extends substantially lateral to the first assembly. The first and second assemblies are both adapted to receive a cooking device, for example an auxiliary burner such as an outdoor stove-top burner, or a deep fryer. As a result, the frame may provide a plurality of such outdoor cooking devices.

Preferably, the frame assemblies **12, 14, 40** are constructed from tubular members. In addition, the alternate embodiment described above, the frame for an outdoor cooking device, is preferably constructed from tubular members. However, single-sided and two- or three-sided members are within the scope of the invention. Multi-sided members can have a variety of cross-sectional shapes, including but not limited to square, rectangular, U-shaped, or circular.

Preferably, the members **26, 28, 30** are pre-assembled to form the upper assembly and the members **32, 36** are pre-assembled to form the lower assembly **14.** The degree or level of assembly for each of the assemblies **12, 14** can vary. Accordingly, either of the upper or lower assemblies **12, 14** can be partially pre-assembled. Similarly, the lateral assembly **40**

can be partially pre-assembled.

Welding is the preferred method to pre-assemble the members **26**, **28**, **30**, **32**, **36** due to the high strength and durability it provides. However, the members can be pre-assembled with a number of different methods, including but not limited to fasteners, such as rivets, pins, or threaded fasteners. As discussed in detail below, pre-assembling the assemblies **12**, **14** significantly reduces the time required to assemble the grill assembly **10.**

The upper and lower assemblies **12**, **14** are joined by mechanical engagement of an engagement assembly **46.** Similarly, the upper and lateral assemblies **12**, **40** are joined by engagement assembly **46.** The engagement assembly **46** is positioned proximate the junction **11**. Although a total of six separate engagement assemblies **46** are shown in FIGS. 2 and 3, a greater or lesser quantity of assemblies **46** can be employed to join the upper and lower assemblies **12**, **14** and the upper and lateral assemblies **12**, **40** depending upon the design parameters, including the configuration of each assembly **12**, **14**, **40.**

Referring to FIGS. 3-5, the engagement assembly **46** comprises a projection **48** and a receiver **50.** As described more fully below, an open end of a member has an inner dimension that generally defines the receiver **50.** The receiver **50** is adapted to receive a portion of the projection **48**. When the receiver **50** receives an extent of the length of the projection **48**, the receiver **50** and the projection **48** are in a mating arrangement.

The projection **48** can be positioned on the upper assembly **12**, the lower assembly **14**, or the lateral assembly **40.** The receiver **50** can be positioned on the upper assembly **12**, the lower assembly **14**, or the lateral assembly **40.** These attributes increase the flexibility and utility of the grill assembly **10.** The projection **48** and the receiver **50** are generally

positioned or located on opposing assemblies **12**, **14**, **40.** For example, when the projection **48** is on one of the upper assembly **12** or the lower assembly **14**, the mating receiver **50** is on the other of the upper assembly **12** or the lower assembly **14.**

Alternatively, the projection **48** can be positioned on a lower portion of the cooking chamber **16** or depend from a lower portion of the cooking chamber **16.** Also, the receiver **50** can be positioned on a lower portion of the cooking chamber **16** or depend from a lower portion of the cooking chamber **16.** In this set of configurations, the cooking chamber **16** can be at least partially formed from cast material and the projection **48** and the receiver **50** can be formed from the same cast material. Such an arrangement of extending cast material, such as steel or aluminum, to form a projection **48** or a receiver **50** may also be used for the lateral assembly **40**.

As shown in FIG. 3, the open end **27** of the upper vertical member **26** has an interior dimension that generally defines the receiver **50** for the upper assembly **12.** Similarly, the open end **29** of the upper horizontal members **28** has an interior dimension that generally defines the receiver **50** for the lateral assembly **40.** However, an open end (not shown) of the lower frame member **32** can define the receiver **50**, and an open end (not shown) of the lateral frame member **42** can define the receiver **50.** Projections **48** are shown on both a lower vertical member **32** of the lower assembly **14** and a lateral frame member **42** of the lateral assembly **40.** However, the projection **48** can be positioned in the open end **27** of the upper vertical member **26** or in the open end **29** of the upper horizontal member **28.**

Although the receiver **50** is shown as having a square cross-section, the configuration of the receiver **50** may vary depending upon the configuration of the members **26**, **28**, **32**, **42.**

For example, the receiver **50** will have a round cross-section when suitable cylindrical members **26, 28, 32, 42** are used in the assemblies **12, 14, 40.** When two-sided members **26, 28, 32, 42** are used in the assemblies **12, 14, 40**, the receiver **50** will have an L-shaped cross-section.

The engagement assembly **46** can further include means **52** for biasing the projection **48** in the receiver **50.** An aperture **31**, preferably threaded, is positioned near each receiver **50** and is adapted to receive a portion of the biasing means **52.** As shown in FIGS. 4 and 5, the projection **48** has a first portion or leg **54**, a second portion or leg **56**, and an intermediate portion **58.** The length of the first portion **54** can exceed the length of the second portion **56.** The intermediate portion **58** is adapted to permit biasing or flexing of the first portion **54** and/or the second portion **56.** To facilitate assembly of the upper and lower assemblies **12, 14,** the intermediate portion **58** can have a reduced thickness or a tapered configuration. The tapered configuration of the intermediate portion **58** functions as a guide during assembly of the upper and lower assemblies **12, 14**. In addition, the tapered configuration of the intermediate portion **58** facilitates biasing. The degree or amount of biasing varies with the design parameters of the grill assembly **10**, including the design of the projection **48**. The biasing means **52** can include a threaded fastener **72** and a washer **74.** Alternatively, the fastener **72** can be replaced by a pin.

Referring to FIG. 5, the first portion **54** has an inner surface **60** and an outer surface **62.** The second portion **56** has an inner surface **64** and an outer surface **66.** A boss **68** is positioned on the inner surface **64** and is adapted to receive a portion of the biasing means **52.** The boss **68** can be formed by applying a punching force to the outer surface **66** or by

adding an amount of material to the inner surface **64.** The second portion **56** has a free end **84**. In either the unbiased or biased positions, the free end **84** is unsecured and adapted for biasing.

An aperture **70**, preferably threaded, is positioned in the first portion **54.** The aperture **70** is adapted to receive a portion of the biasing means **52.** The aperture **70** and the boss **68** are cooperatively aligned such that a first end of the biasing means **52** engages the boss **68** when the biasing means **52** extends through the aperture **70**.

As shown in FIGS. 2 and 3, two projections **48** in the lower assembly **14** are oriented in a different direction than the remaining projections **48** in the assembly **14.** This means that the orientation of the projections **48** in the front portion of the lower assembly **14** differs from those in the rear portion of the assembly **14.** Similarly, the projections **48** in the lateral assembly **40** are oriented in a different direction. Varying the orientation of the projections **48** ensures that the grill assembly **10** will be properly assembled. For example, when the upper assembly **12** is properly positioned, the aperture **31** in the upper member **26** will align with the mating aperture **70** in the projection **48.** In contrast, when the upper assembly **12** is improperly positioned, the aperture **31** in the upper member **26** will not align with the aperture **70** in the projection **48**, thereby preventing the biasing means **52** from securing the assemblies **12, 14.** In this manner, the projection **48** and the receiver **50** are cooperatively aligned. Consequently, as the orientation of the projections **48** is altered, the orientation of the apertures **31** is similarly altered. The precise orientation of the projections **48** can vary depending upon the design parameters, including the configuration of the projections **48.**

The projection **48** can be formed from plastic, steel, aluminum, or other metals,

including metal alloys. Forming the projection **48** from metal is preferred because of its high strength and deformability. Depending upon the material used to form the projection **48**, the degree and amount of elastic deformation of the projection **48** will vary.

A portion of the upper and lower assemblies **12**, **14** are shown joined in FIGS. 6 and 7. The projection **48** and the receiver **50** are cooperatively dimensioned such that a portion of the projection **48** is received by the receiver **50.** Because the projection **48** and the receiver **50** are cooperatively dimensioned, the projection **48** is removably insertable in the receiver **50.** In this manner, a projection 48 mates with a corresponding receiver 50. Described in a different manner, the receiver **50** removably receives a portion of the projection **48.** As a result, the projection **48** can be repeatedly inserted into and received by the receiver **50**. In a preferred embodiment, the projection **48** can be repeatedly inserted into and received by the receiver **50** without damaging the receiver **50** or altering the configuration of the receiver **50.**

The projection **48** is shown on a lower vertical member **32** of the lower assembly **14** and the receiver **50** is shown on an upper vertical member **26** of the upper assembly **12.** However, the projection **48** can be positioned on the vertical member **26** of the upper assembly **12** and the receiver **50** can be positioned on the vertical member **32** of the lower assembly **14.**

The size and configuration of the engagement assembly **46**, including the projection **48** and the receiver **50**, can be varied according to the configuration of the members comprising the assemblies **12**, **14**, and **40.**

As shown in FIGS. 6 and 7, a lower portion **76** of the first portion **54** of the projection

48 is attached to an inner surface **78** of the receiver 50 of the frame member **32.** Preferably, the lower portion **76** is fixedly attached to the inner surface **78.** Referring to FIGS. 6 and 8, before the biasing means **52** is inserted, a first cavity or clearance **C1** exists between an upper portion **80** of the first portion and an inner surface **82** of the receiver **50.** A second cavity or clearance **C2** exists between the inner surface **82** and the second portion **56.** A third cavity or clearance **C3** exists between the inner surface **78** and the second portion **56.** At this stage, the projection **48** is at an "unbiased position." In FIGS. 7 and 9, the biasing means **52** is inserted through the apertures **31, 70** and into engagement with the boss **68** of the second portion **56.** At this stage, the projection **48** is at a "biased position." In the biased position, a portion of the first portion **54** is biased into contact with the inner surface **82.** Specifically, the upper portion **80** of the first portion **54** is biased into contact with the inner surface **82** such that the clearance **C1** is generally eliminated. This occurs when the threads of the fastening means **52** engage the threads of the apertures **31, 70.** Also, in the biased position, a portion of the second portion **56** is biased or deformed into contact with the inner surfaces **78, 82.** Specifically, the second portion **56** is biased into contact with the surface **78** of the frame member **32** and the inner surface **82** of the receiver **50** such that the clearances **C2, C3** are generally eliminated. This occurs when the biasing means **52** engages the boss **68** and exerts a sufficient force on the boss **68** causing the second portion **56** to bias or deform in the direction of the inner surfaces **78, 82.** The biasing or deformation is elastic, meaning that once the applied load is released, the projection **48** returns to its original shape as reflected in the unbiased position.

The location of the boss **68** and the aperture **70** can affect the degree or amount of

biasing with respect to the inner surfaces **78**, **82.** Referring to FIGS. 6 and 7, the boss **68** and aperture **70** are positioned a generally short distance from the intermediate portion **58** and within the upper frame member **26.** In this position, the second portion **56** can be biased against both the inner surface **78** and the inner surface **82** such that the clearances **C2**, **C3** are eliminated. In contrast, the boss **68** and the aperture **70** can be positioned a generally greater distance from the intermediate portion **58** and within the lower frame member **32.** In this position, the second portion **56** can be biased against only the inner surface **78** such that only the clearance **C3** is eliminated.

In the unbiased position, the upper frame member **26** and the lower frame member **32** are joined but transverse movement between the frame members **26**, **32** is not precluded due to the clearances **C1**, **C2**, **C3.** In addition, the frame members **26**, **32** are not adequately secured to prevent longitudinal movement. As a result, the upper assembly **12** and the lower assembly **14** can be separated. In the biased position, the frame member **26**, **32** are adequately secured to generally prevent both longitudinal and transverse movement between the assemblies **12**, **14.** Consequently, the grill assembly **10** has sufficient structural integrity to support the cooking chamber **16.** In a partially biased position (not shown) where the biasing means **52** has been inserted through the apertures **31**, **70** but has not engaged the boss **68**, longitudinal movement between the assemblies **12**, **14** is prevented and transverse movement is prevented to a lesser extent.

Described in a different manner, the upper vertical member **26** has an outer wall surface **86** and the lower vertical member **32** has an outer wall surface **88.** As shown in FIG. 6, when the projection **48** is received by the receiver **50**, the outer wall surface **86** of the

upper frame member **26** is in planar alignment with the outer wall surface **88** of the lower frame member **32**. This means that the outer surfaces **86**, **88** are in close cooperation, meaning that they are generally flush and not offset.

Referring to FIG. 7, when the biasing means **52** is sufficiently inserted into the aperture **70** to bias the first portion **54** into contact with the inner surface **82**, the outer surfaces **86**, **88** remain in planar alignment. When the biasing means **52** is further inserted into the aperture **70** to bias the second portion **56** into contact with the inner surfaces **78**, **82**, the outer surfaces **86**, **88** remain in planar alignment. In contrast to existing grill designs, when the surfaces **86**, **88** are in planar alignment, the vertical members **26**, **32** have a "smooth" appearance causing the grill assembly **10** to have a linear appearance at the junction **11** between the upper and lower assemblies **12**, **14.**

Described in yet another manner and referring to FIGS. 6 and 7, the upper vertical member **26** has an open, outer end **27** with an end surface **27a** with geometric dimensions. The outer dimensions are generally represented by the perimeter of the end **27**. The lower vertical member **32** has an open, outer end **90** with an end surface **90a** with geometric dimensions. The outer dimensions are generally represented by the perimeter of the end **90,** which is generally alignable with the geometric dimensions of the upper member **27**. Preferably, the outer dimensions of the end **27** are equal to the outer dimensions of the end **90**.

When the projection **48** is received by the receiver **50**, the vertical members **26**, **32** are secured in an end-to-end configuration wherein the end **27** is proximate the end **90** and the end surface **27a** is proximate the end surface **90a**. In the end-to-end configuration, the

outer dimension of the upper vertical member **26** is substantially aligned with the outer dimension of the lower vertical member **32.** As a result, there is no overlap or overhang between the outer dimensions of the members **26, 32** or between the ends **27, 90.** When there is either an overlap or an overhang, the junction **11** between the members **26, 32** appears disjointed and the aesthetic appearance of the barbecue grill assembly **10** is reduced.

Referring to FIG. 7, when the biasing means **52** is sufficiently inserted into the aperture **70** to bias the first portion **54** into contact with the inner surface **82,** the vertical members **26, 32** remain secured in an end-to-end configuration and the outer dimensions remain in substantial alignment. When the biasing means **52** is further inserted into the aperture **70** to bias the second portion **56** into contact with the inner surfaces **78, 82,** the vertical members **26, 32** remain secured in an end-to-end configuration and the outer dimensions remain in substantial alignment. Unlike existing grill designs, when the vertical members **23, 32** are in an and-to-end configuration the grill assembly **10** has a linear appearance at the junction **11** between the upper and lower assemblies **12, 14.**

As previously discussed, the projection **48** and the receiver **50** can be used to join the lateral and upper assemblies **12, 40.** Accordingly, the projection **48** can be attached to an inner surface (not shown) of either the lateral member **42** of the lateral assembly **40** or the horizontal member **28** of the upper assembly **12.** The receiver **50** can be positioned on the other of the lateral member **42** or the horizontal member **28.** As discussed above, when the projection **48** is received by the receiver **50** clearances **C1, C2, C3** exist at the unbiased position. When the biasing means **52** is introduced, a portion of the first and second portions **54, 56** is biased into contact with inner surface **82** of the receiver **50** and an inner surface (not

shown) of the horizontal member **42.** At this point, the clearances **C1, C2, C3** are generally eliminated and the projection **48** is at the biased position. In the biased position, the members **28, 42** are adequately secured to prevent both longitudinal and transverse movement between the assemblies, **12, 40.** Consequently, the lateral assembly **40** is supported in a cantilevered position and the grill assembly **10** has sufficient structural integrity to support a work surface or an auxiliary cooking device in a cantilevered position.

Described in a different manner, when the projection **48** is received by the receiver **50** an outer wall surface (not shown) of the lateral frame member **42** and an outer wall surface (not shown) of the upper horizontal member **28** are in planar alignment. When the biasing means **52** is sufficiently inserted into the apertures **31, 70** to bias the first portion **54** into contact with the inner surface **82** of the receiver **50**, the outer wall surface of the lateral member **42** and the outer wall surface of the upper member **28** remain in planar alignment. When the biasing means **52** is further inserted into the apertures **31, 70** to bias the second portion **56** into contact with the inner surface **82** and an inner surface of the lateral member 42, the outer wall surface of the lateral member **42** and the outer wall surface of the upper member **28** remain in planar alignment. Accordingly, the grill assembly **10** has increased structural integrity and a linear appearance at the junction **11** of the upper and lateral assemblies **12, 40.**

Described in yet another manner, when the projection **48** is received by the receiver **50**, the lateral frame member **42** and the horizontal member **28** are secured in an end-to-end configuration wherein an end **29** of the member **28** is proximate an end **43** of the member **42.** In this end-to-end configuration, the outer dimension, meaning the perimeter, of the member

28 is substantially aligned with the outer dimension, meaning the perimeter, of the member **32**. When the biasing means **52** is sufficiently inserted into the apertures **31**, **70** to bias the first portion **54** into contact with the inner surface **82**, the members **28, 42** remain secured in an end-to-end configuration and the outer dimensions remain in substantial alignment. When the biasing means **52** is further inserted into the apertures **31**, **70** to bias the second portion **56** into contact with the inner surface **82** and an inner surface of the lateral member **42**, the members **28, 42** remain secured in an end-to-end configuration and the outer dimensions remain in substantial alignment. When the members **28, 42** are in an and-to-end configuration the grill assembly **10** has a linear appearance at the junction **11** of the upper and lateral assemblies **12**, **40.**

An alternate embodiment of the projection **48** is shown in FIGS. 10-14 positioned on lateral frame member **42.** The projection **148** has a single-blade configuration. The projection **148** has an inner surface **160** and an outer surface **162.** An aperture **170**, preferably threaded, is positioned in an upper portion **180** of the projection **148.** The aperture **170** is adapted to receive a portion of the biasing means **52.**

Referring to FIGS. 11-14, the upper and lateral assemblies **12**, **40** are shown joined. The projection **148** and the receiver **50** are cooperatively dimensioned such that a portion of the projection **148** is received by the receiver **50.** A lower portion **176** is attached to an inner surface **178** of the lateral member **42** of the lateral assembly **40.** As shown in FIGS. 11 and 13, before the biasing means **52** is inserted, a first clearance **C1** exists between an upper portion **180** and the inner surface **82** of the receiver **50.** At this stage, the projection **148** is at an "unbiased position." In FIGS. 12 and 14, the biasing means **52** is inserted through the

apertures **31, 170** and into engagement with the inner surface **82.** At this stage, the projection **148** is at a "biased position." In the biased position, the upper portion **180** is biased into contact with the inner surface **82** such that the clearance **C1** is generally eliminated. This occurs when the threads of the fastening means **52** engage the threads of the apertures **31, 170.** The biasing or deformation is elastic, meaning that once the applied load is released, the projection **148** returns to its original shape as reflected in the unbiased position.

Yet another embodiment of the projection **48** is shown in FIG. 15. The projection **248** has a double-blade configuration with a first portion **254** and a second portion **256** spaced a distance apart. The first portion **254** has an inner surface **260** and an outer surface **262**, a portion of which is attached to an inner surface **278** of the lateral member **42** of the lateral assembly **40.** The second portion **256** has an inner surface **264** and outer surface **266**, a portion of which is attached to inner surface **278.** An aperture **270** , preferably threaded, is positioned in the first portion **254.** A boss **268** is positioned on the inner surface **264** and is adapted to receive the biasing means **52.** The projection **248** and the receiver **50** are cooperatively dimensioned such that a portion of the projection **248** is received by the receiver **50**.

In another preferred embodiment and as shown in FIGS. 16 and 17, the grill assembly **10** includes at least one junction **11.** In general terms, the junction **11** is a cooperative structure resulting from joined structures of the grill assembly **10**. Specifically, the junction **11** is a cooperative structure between the lower frame member **32** and the upper frame member **26.** In addition, the junction **11** is a cooperative structure between the lateral member **42** and the horizontal member **28.**

The grill assembly **10** includes a union member **300**, which is a separate structure adapted to join the upper assembly **12** and the lower assembly **14** at the junction **11.** In addition, the union **300** is adapted to join the upper assembly **12** and the lateral assembly **40** at the junction **11.**

Although the junction **11** is shown at a general mid-point between the upper and lower assemblies **12**, **14**, junction **11** can be located at various points in the grill assembly **10.** Consequently, the length of the members in the upper and lower assemblies **12**, **14** can vary. Although a total of six separate junctions **11** and union members **300** are shown in FIGS. 18 and 19, a greater or lesser quantity of junctions **11** and union members **300** can be employed to join the upper and lower assemblies **12, 14** and the upper and lateral assemblies **12**, **40** depending upon the design parameters, including the configuration of each assembly **12**, **14**, **40.**

The union member **300** has an outer surface **302** and an inner surface **304.** The union member **300** has a length **L** and a width **W**, generally defining a perimeter **P**. The length **L** and the perimeter **P** of the union member **300** can vary with the design parameters of the grill assembly. However, the union member **300** has a minimum length **L** and a minimum perimeter **P** such that the outer surface **302** of the union member **300** is in frictional engagement with a portion of the inner surface **306** of the vertical member **26** and a portion of an inner surface **308** of the vertical member **32.**

To join the upper assembly **12** and the lower assembly **14**, the union member **300** is positioned at the junction **11** within the vertical member **26** of the upper assembly **12** and/or the vertical member **32** of the lower assembly **14.** Accordingly, the union **300** is

cooperatively dimensioned with the vertical members **26, 32.** When the union **300** is positioned within the vertical members **26, 32,** an outer surface **302** of the union member **300** is in frictional engagement with a portion of an inner surface **306** of the vertical member **26** and a portion of an inner surface **308** of the vertical member **32.** The frictional engagement between the vertical members **26, 32** prevents the separation of the upper and lower assemblies **12, 14.** The degree or level of frictional engagement varies with the configuration and dimensions of the union **300** and the members **26, 32.**

As shown in FIG. 16, when the union member **300** is positioned within the vertical members **26, 32,** a first portion **310** of the union member **300** extends past the end **27** of the vertical member **26.** Similarly, a second portion **312** of the union member **300** extends past the end **90** of the vertical member **32.** An intermediate portion **314** of the union member **300** is positioned proximate the junction **11.**

When the union member **300** is positioned within the vertical members **26, 32,** the outer wall surface **86** of the upper vertical member **26** is in planar alignment with the outer wall surface **88** of the lower vertical member **32.** Consequently, the grill assembly **10** has a linear appearance at the junction **11** of the upper and lower assemblies **12, 14.** Furthermore, when the union member **300** is positioned within the vertical members **26, 32,** the end **27** of the upper vertical member **26** and the end **90** of the lower vertical member **32** are in an end-to-end configuration.

To join the upper assembly **12** and the lateral assembly **40,** the union member **300** is positioned at the junction **11** within the horizontal member **28** of the upper assembly 12 and the lateral member **42** of the lateral assembly **40.** Accordingly, the union **300** is

cooperatively dimensioned with the vertical members **28**, **42.** When the union **300** is positioned within the vertical members **28**, **42**, an outer surface **302** of the union member **300** is in frictional engagement with a portion of an inner surface of the horizontal member **28** and a portion of an inner surface of the lateral member **42.**

When the union member **300** is positioned within the horizontal member **28** and the lateral member **42**, the an outer wall surface (not shown) of the horizontal member **28** is in planar alignment with an outer wall surface (not shown) of the lateral member **42.** Consequently, the grill assembly **10** has a linear appearance at the junction **11** of the upper and lateral assemblies **12**, **40.** Furthermore, when the union member **300** is positioned within the members **28**, **42**, the end **29** of the horizontal member **28** and the end **43** of the lateral member **42** are in an end-to-end configuration.

Although the upper assembly **12** and the lower assembly **14** are joined at the junction **11** with the union member **300**, the assemblies **12**, **14** are not fully secured to prevent longitudinal movement between the assemblies **12**, **14.** To fully secure the upper and lower assemblies **12**, **14**, a means for locking (not shown) can be utilized with the union member **300.** Specifically, the locking means locks the union **300** within the frame members **26**, 32 to secure the upper and lower assemblies **12**, **14.** Similarly, the locking means can be used to lock the union **300** within the frame members **28**, **42** to secure the upper and lateral assemblies **12**, **40.** The locking means may include a radial projection and a mating detent, or may include an aperture for receiving a fastener. In the later configuration, the frame members **26**, **32** have an aperture that is cooperatively positioned.

Alternatively, the first portion **310** of the union **300** can have a tapered configuration

such that the perimeter of the first potion **310** is greater than the perimeter of the intermediate portion **314.** Similarly, the second portion **312** can have a tapered configuration such that the perimeter of the first potion **310** is greater than the perimeter of the intermediate portion **314.** The tapered configuration of the union **300** can facilitate the positioning of the union **300** within the members **26**, **28**, **32**, **42** and can further facilitate the securement of the members **26**, **28**, **32**, **42.**

In a preferred embodiment, the union **300** is first positioned at the junction **11** in one of either the upper frame member **26** or the lower frame member **32.** Next, the other of the upper frame member 26 or the lower frame member **32** is brought into engagement with the union **300.** For example, the union **300** is positioned within the lower frame member **32.** Then, the frame member **26** is brought into engagement with the union **300.** As a result, the upper frame assembly **12** and the lower frame assembly **14** are joined at the junction **11.** The upper frame assembly **14** and the lateral frame assembly **40** are joined in a similar manner.

In an another preferred embodiment, the union **300** is fixedly secured to one of either the upper frame member **26** or the lower frame member **32.** In this configuration, the second portion **312** of the union **300** is secured to the inner surface **302** of the frame member **32** by weldment or other suitable means. The upper frame member **26** is then brought into engagement with the union **300.** As a result, the upper frame assembly **12** and the lower frame assembly **14** are joined at the junction **11.**

In yet another preferred embodiment, the union member **300** is biased into engagement with an inner surface of the members **26**, **32.** For example, the first portion **310** can be biased into engagement with the inner surface **306** of the frame member **26.**

Alternatively, the second portion **312** can be biased into engagement with the inner surface **308** of the frame member **32.** The union member **300** may include means for biasing the union member **300** into engagement with an inner surface of the members **26, 32.** Such means can include a fastener or a pin.

As shown in FIGS. 16 and 17, the union member **300** has a generally square-shaped cross-section. This configuration is necessary because the union member **300** is positioned within frame members **26, 28, 32, 42** that have a generally square-shaped cross-section. Accordingly, the configuration of the union member **300** varies with the configuration of the frame members **26, 28, 32, 42.** When the frame members 26, **28, 32, 42** have a curvilinear configuration, the union members **300** have a similar curvilinear configuration. Preferably, the union member **300** is tubular, however, the union member **300** can have a solid configuration. In addition, the union member **300** can have a segmented configuration with at least one recess.

As discussed above, the union member **300** has a series of dimensions including a length **L** and a width **W**, generally defining a perimeter **P**. These dimensions can vary greatly with the design parameters of the union **300** and the assemblies **12, 14, 40.** Because the union member **300** is positioned with the frame members **26, 28, 32, 42**, and frictionally engages an inner surface of the frame members **26, 28, 32, 42**, the union **300** is cooperatively dimensioned with the frame members **26, 28, 32, 42.** Accordingly, as the dimensions, e.g,. width and perimeter, of the frame members **26, 28, 32, 42** are increased, the dimensions, e.g,. width and perimeter, of the union member **300** are increased. This increase in the dimensions ensures that the outer surface **302** of the union member **300** frictionally engages

an inner surface of the frame members **26**, **28**, **32**, **42** to join the assemblies **12**, **14**, **40.**

The union **300** can be formed from plastic, steel, aluminum, or other metals, including metal alloys. Forming the union **300** from metal is preferred because of its high strength.

The grill assembly **10** has a number of unique design features that benefit the packaging aspects of the assembly **10.** Referring to FIG. 18, the lower vertical members **32**, lower cross member **36** and lower horizontal members **100** are secured to define an inner space **102** of the lower assembly **14** that is suitable for receiving the upper assembly **12.** The members **26, 28, 30** of the upper assembly **12** are secured to define an inner space **103** of the upper assembly **12** that is suitable for receiving a portion of the lower assembly **14.**

As shown in FIG. 19, at least a portion of the upper assembly **12** can be placed within the inner space **102.** When the upper assembly **12** is positioned within the inner space **102**, at least one upper vertical member **26** of the upper assembly **12** is proximate a corresponding lower vertical member **32** of the lower assembly **14.** Alternatively, at least a portion of the lower assembly **14** can be placed within the inner space **103**. In the configuration shown in FIG. 19, the grill assembly **10** is in a "stacked position." In the stacked position, the assemblies **12**, **14** are nested and the lateral assembly **40** can be positioned proximate the assemblies **12**, **14** to form a relatively compact, yet rigid structural arrangement.

The grill assembly **10** can be packaged for distribution in the stacked position. In the stacked position, the grill assembly **10** has a generally small volume and a generally small footprint as compared to existing grill assemblies. These attributes significantly reduce the packaging costs of the grill assembly **10** because the assembly **10** can be packaged for

distribution and shipping in a container with smaller dimensions than those currently used. The packaging costs are further reduced when the grill assembly **10** is packaged in the large overseas containers typically used for international distribution.

As shown in FIGS. 18 and 19, the upper assembly **12** and the lower assembly **14** are pre-assembled. Alternatively, the degree of pre-assembly for each of the upper assembly **12** and the lower assembly **14** can vary with the numerous packaging parameters of the grill assembly **10**.

For example, the upper assembly **12** can be pre-assembled and the lower assembly **14** can be either partially or fully un-assembled. The lower assembly **14** would then require separate construction and securement to the upper assembly **12**. As another example, the lower assembly **14** can be pre-assembled and the upper assembly **12** can be either partially or fully pre-assembled. The upper assembly **12** would then require separate construction and securement to the lower assembly **14**.

Although the lateral assembly **40** is shown in FIGS. 18 and 19 as being assembled, the level or degree of pre-assembly of this component can vary with the packaging parameters.

Alternatively, packaging of the assembly **10** is benefitted by providing an upper frame assembly **12** with a preformed arrangement with a cooking device, such as an outdoor stove top, secured thereto. The lower frame assembly **14** may then be constructed separately by securement to the pre-assembled upper assembly **12**.

In another preferred embodiment, the packaging of the grill assembly **10** includes at least one union member **300.** The union member **300** can be packaged "loose " meaning that

it is packaged as an individual component that is used during the construction of the assembly **10.** Alternatively, the union member **300** is pre-positioned in one of either the upper assembly **12** or the lower assembly **14.** Similarly, the union member **300** is pre-positioned in one of either the upper assembly **12** or the lateral assembly **40.** Pre-positioning of the union member **300** reduces the number of steps required to construct the grill assembly **10.**

Because the grill assembly **10** can be packaged in the stacked position, the number of separate components in the container can be significantly reduced. A reduction in the number of components is advantageous because there is a reduction in the time required to assemble the grill assembly **10.** The number of components can vary depending upon the design parameters. However, the grill assembly **10** can be packaged in as few as three separate components - - the upper assembly **12**, the lower assembly **14**, and the lateral assembly **40.** In this manner, the individual components of each assembly **12**, **14**, **40** can be pre-assembled in the manufacturing facility. Consequently, each assembly **12**, **14**, **40** can be packaged as a complete unit. This means that each assembly **12**, **14**, **40** would have the specific components necessary to operate the grill assembly **10.**

For example, the cooking chamber **16** and the temperature gage **21** can be pre-assembled in the upper assembly **12**, the wheels **22** and the casters **24** can be pre-assembled in the lower assembly **14**, and the controls **20** can be pre-assembled in the lateral assembly **40.** A purchaser of the grill assembly **10** would remove the three assemblies **12**, **14**, **40** from the container and begin the assembly process, which due to the pre-assembled status of the assemblies **12**, **14**, **40** would require relatively few steps. First, the upper assembly **12** from

the lower assembly **14** is lifted upward to remove it from the stacked position. After sufficiently elevating the upper assembly **12**, it is aligned with the lower assembly **14.** Next, the upper assembly **12** is brought into engagement with the lower assembly **14** such that the projection(s) **48** is received by the receiver(s) **50** in the upper assembly **12.** The lateral assembly **40** is then brought into engagement with the upper assembly **12** such that the projection(s) **48** is received by the receiver(s) **50** in the upper assembly **12.**

At this stage, the upper assembly **12** and the lower assembly **14** are joined but are not yet fully secured to prevent longitudinal movement between the assemblies **12, 14.** To additionally secure the assemblies **12, 14**, at least one biasing means **52** is inserted into the apertures **31, 70.** When at least one projection **48** is biased or deformed into the biased position, the assemblies **12, 14** are thereby secured to prevent both longitudinal and transverse movement between the assemblies **12, 14.**

Also at this stage, the upper assembly **12** and the lateral assembly **40** are joined but not fully secured to prevent longitudinal movement between the assemblies **12, 40.** To additionally secure the assemblies **12, 40**, at least one biasing means **52** is inserted into the apertures **31, 70** such that at least one projection **48** is biased or deformed into the biased position.

In contrast to existing grill designs, the upper assembly **12** does not require rotation, pivoting, or angular movement during the assembly process. Similarly, the lateral assembly **40** does not require rotation, pivoting, or angular movement during the assembly process of the grill assembly **10.**

In another preferred embodiment, the grill assembly **10** includes at least one union

member **300** used to join the upper assembly **12** and lower assembly **14**, and the upper assembly **12** and the lateral assembly **40.** The grill assembly **10** can be constructed in a number of ways using the union member **300.** For example, a portion of the union member **300** is positioned within the vertical member **32** of the lower assembly **14.** Specifically, the first portion **310** of the union member **300** extends past the end **90** of the frame member **32** and the second portion **312** is positioned within the frame member **32.** Next, the upper frame member **26** is brought into engagement with the union member **300.** Specifically, the first portion **310** of the union member **300** is positioned within the frame member **26.** As a result, the upper frame assembly **12** and the lower frame assembly **14** are joined. Alternatively, the union member **300** can be first positioned within the upper frame member **26.**

Alternatively, the locking means **350** can be utilized with the union member **300** after the upper assembly **12** and the lower assembly **14** are joined. The locking means **350** ensures that upper assembly **12** and the lower assembly **14** remain secured.

The grill assembly **10** has a number of unique design features that benefit the storage aspects of the assembly **10.** The grill assembly **10** has an overall height that can be significantly reduced by separating or breaking down the upper and lower assemblies **12, 14.** Referring to FIG. 18, the assemblies **12, 14** can be separated by removing the biasing means **52.** Because the projection **48** and the receiver **50** are cooperatively dimensioned to permit removable insertion, the upper assembly **12** can be lifted from the lower assembly **10** once the biasing means **52** are removed. The upper assembly **12** can then be positioned within the inner space **102.**

Similarly, the grill assembly **10** has an overall width that can be significantly reduced

by breaking down the upper and lateral assemblies **12**, **40.** Once the biasing means **52** are removed, the assemblies **12**, **40** can be separated and the lateral assembly can be positioned proximate the assemblies **12**, **14.** At this point, the grill assembly **10** is returned to the stacked position. In the stacked position, the grill assembly **10** can be easily stored since it has a generally small volume and a generally small footprint.

While specific embodiments have been illustrated and described, numerous modifications come to mind without significantly departing from the spirit of the invention and the scope of protection is only limited by the scope of the accompanying Claims.